

**Remarks/Arguments**

The office Action of September 8, 2010 and the references cited therein have been carefully studied and reviewed.

The specification has been amended to correct minor or obvious errors.

Claims 1 - 4 and 10, drawn to the elected invention, stand rejected under 35 U.S.C. §103.

Claims 5 – 9, drawn to the non-elected invention, remain withdrawn from consideration.

Claim 10 has been canceled.

New claims 11 – 17 have been added.

**I. THE REJECTIONS OF CLAIMS 1 – 4 UNDER 35 U.S.C. §103**

It is respectfully requested that the Examiner reconsider and withdraw the rejection of Applicants' claims over the body of references to Iwamoto et al. (USP 6,156,153), Lu et al. (USP 6,416,587), Lee (USP 6,001,216), SU 1063768 and Cheng (USP 5,885,403), for the following reasons.

A. Applicants' invention is fundamentally different from those disclosed by the primary references to Iwamoto et al. and Lu et al.

Whereas Applicants' claimed invention is drawn to a system that can both clean **and** rinse a batch of wafers, the primary references only disclose systems that can clean **or** rinse a batch of wafers. More specifically, Applicants' claims recite a system that includes both **a source of cleaning solution** 36 by which cleaning chamber 30 can be filled with cleaning solution **and a source of de-ionized water** DI which can be used for rinsing the wafers after they are cleaned by the cleaning solution. To this end, de-ionized water supply nozzles 34 are connected to the source of deionized water DI so that deionized water from the source is sprayed into the cleaning chamber 30.

1. The Iwamoto et al. system

On the other hand, Iwamoto discloses a system having a source of cleaning solution supplied into a cleaning chamber by supply nozzles 4, but no additional source of deionized water separate from the source of cleaning solution so as to provide the system with a capability of rinsing the wafers as well as cleaning them. That is, contrary to the position taken by the Examiner at the bottom of page 2 of the Office Action, Iwamoto et al. do not disclose a system having both “a source of cleaning solution (see ‘chemical’, col. 4, lines 24 – 28) associated with said cleaning chamber” **and** “a source of de-ionized water (see ‘pure water’, col. 4, line 25). Rather, as col. 4, lines 22 – 28 makes clear, the “cleaning solution” source connected to the nozzles 4 may be either a source of chemicals **or** a source of pure water.

2. The Lu et al. system

As clearly acknowledged by the Examiner, Lu et al. disclose a system having a source of rinsing water, which water is supplied to cleaning chamber 5 via water supply pipes 8, but which has no additional source of cleaning solution. Regardless, the Examiner states at the bottom of page 8 of the office Action that “[i]t is well known in the art to use the same container for washing and other liquid treatments, to save <sic> th3e expense of plural individual treatment <sic> container”.

However, the Examiner does not provide any reason whatsoever as to why one of ordinary skill in the art would have been prompted to have modified the system of Lu et al. to include an additional chemical liquid treatment capability instead of merely selecting from among the so-called “well known” systems. It is only through impermissible hindsight that the Examiner relies on the reference to Lu et al. Also, the Examiner does not provide any detail as to how the system of Lu et al. is to be modified, i.e., what components are to be added and where.

That is, absent some rationale as to why one of ordinary skill in the art would have been prompted to have modified the rinsing system of Lu et al. and absent any description of how the system of Lu et al. is to be modified, the

Examiner has not procedurally or substantively established a prima facie case of obviousness under 35 U.S.C. §103.

For these reasons, the rejections based on the primary references to Iwamoto et al. and Lu et al. should both be withdrawn.

B. The secondary reference to Lee

1. The reference to Lee does not teach Applicants' claimed sets of nozzle holes.

Applicants claims also recite that the deionized water supply nozzles 34 each have sets of nozzle holes 40, that the nozzle holes 40 of each set lie in a plane relative to the longitudinal direction of the main body of the nozzle 34, and that each such set of nozzle holes subtends an angle of 80~100° **about the inner nozzle passageway** (see FIG. 5 showing two such sets of nozzle holes 40 of deionized water supply pipe 34 subtending an angle of 90° about the passageway whose diameter is  $0.8 \pm 0.005\text{mm}$ ).

Contrary to the position taken by the Examiner at the bottom of page 3 of the Office Action, Lee does not teach a supply nozzle that includes any set of nozzle holes lying in a plane and in particular, holes that subtend an angle of 80~100° about the inner main passageway of the nozzle.

Lee teaches a system that includes chemical supply nozzles 42 for supplying etching solution into chamber 11, and a recirculation system for circulating the etching solution from the bottom of the cleaning chamber 11 back into the chamber via supply tubes 41 each having a supply line 43 extending therefrom.

The Examiner directs Applicants' attention to col. 5, lines 31 – 57 of Lee which pertains to the recirculation system.

Even here, though, Lee only teaches that for each supply tube 41 having an inner passageway, only one supply line 43 is provided in any respective plane perpendicular to the inner passageway of the tube 41. Such a line 41 thus

subtends an angle of 0° or 360° with respect to the inner passageway of the tube 41 from which it extends.

That is, it can not be said that the single supply line 43 extending from the inner passageway of a supply tube 48 is in any way suggestive of a set of nozzle holes lying in a plane. It also can not be said that the single supply line 43 extending from the inner passageway of a supply tube 48 is in any way suggestive of a plurality of nozzle holes that subtend an angle of 80~100° in a given plane.

Accordingly, the rejection based on the Lee reference should be withdrawn.

2. The rejection based on Lee lacks a rational underpinning and thus does not establish a *prima facie* case of obviousness.

The Examiner also states that it would have been obvious to simply modify the primary references to Iwamoto et al. or Lu et al. in view of such teachings because doing so would not change the “function” of the supply line 43 taught by Lee et al.

Applicants strenuously disagree.

As mentioned above, the supply tubes 48 and supply lines 43 are part of a recirculation system in Lee, as distinguished from the nozzles 42 connected to the source of the etching solution. Furthermore, not only do the supply lines 41 function as recirculating means, but the downward inclination of these lines is provided so that such lines 41 function as a gravity feed (col. 5, lines 35 – 37).

Incorporating any teachings associated with these **gravity feed** recirculating lines 41 into the **force fed** supply nozzles of Iwamoto et al. or Lu et al. would entail a change in the function associated with these teachings. Thus, the rejection based on the reference to Lee is deficient on its face, with respect to establishing a *prima facie* case of obviousness, and should be withdrawn.

3. The Examiner also has also failed to procedurally establish a *prima facie* case of obviousness in connection with the incorporation of the reference to Lee into the rejection.

Stating that it would obvious **merely to modify** the system of Iwamoto et al. or Lu et al., as does the Examiner, is insufficient to procedurally establish a *prima facie* case of obviousness under 35 U.S.C. §103. In particular, the Examiner fails to identify exactly which features/elements of the systems of Iwamoto et al. or Lu et al. would be modified and how.

The rejection thus lacks the specificity necessary to articulate a rational underpinning behind the rejection. For this reason as well, the rejection based on the reference to Lee is deficient on its face, with respect to establishing a *prima facie* case of obviousness, and should be withdrawn.

C. The SU '768 reference

1. The reference is non-analogous prior art.

The tin can washing system of the SU '768 passes tin cans down a set of rails under gravity in an open space, and the cans are first washed and then scalded with water and steam by jets sprayed directly onto the surfaces of the tin cans.

Such a rail and gravity feed system is significantly structurally different from Applicants' claimed wafer wash and rinse system, and the water wash, and steam scald performed by the system of the SU '768 reference is significantly different from the function of Applicants' claimed system because the direct jet water wash and scald of the reference is totally inappropriate for cleaning wafers.

Hence, the SU '768 reference is clearly non-analogous prior art and as such the rejection based on the reference should be withdrawn.

2. This secondary reference also does not teach Applicants' claimed sets of nozzle holes.

As mentioned above, Applicants claims also recite that the deionized water supply nozzles 34 each have sets of nozzle holes 40, that the nozzle holes 40 of each set lie in a plane relative to the longitudinal direction of the main body of the nozzle 34, and that each such set of nozzle holes subtends an angle of 80~100° **about the inner nozzle passageway** (see FIG. 5 showing two such sets of nozzle holes 40 of deionized water supply pipe 34 subtending an angle of 90° about the passageway whose diameter is  $0.8 \pm 0.005\text{mm}$ ).

Contrary to the position taken by the Examiner at the bottom of page 3 of the Office Action, the SU '768 reference does not teach a supply pipe that includes any set of nozzle holes lying in a plane relative to the main body of the nozzle and in particular, holes that subtend an angle of 80~100° in such a plane.

As is clear from FIG. 2, the water supply pipes (shown in circular cross section in the figure) each have only a single nozzle opening in any plane (in this case, the plane of the sectional view of the figure).

Also, the angle of 70° - 85° referred to by the Examiner in the rejection does not appear, at least from FIG. 2, to have anything to do with the nozzle openings.

Thus, it can not be said that the single nozzle opening extending from the inner passageway of a nozzle in the SU '768 reference is in any way suggestive of a set of nozzle holes lying in a plane. It also can not be said that the single nozzle opening extending from the inner passageway of the nozzle is in any way suggestive of a plurality of nozzle holes that subtend an angle of 80~100° in a given plane.

Accordingly, the rejection based on the SU '768 reference should be withdrawn.

3. The Examiner also has also failed to procedurally establish a *prima facie* case of obviousness relative to SU '768 in connection with the incorporation of the reference to Lee into the rejection.

To reiterate, stating that it would obvious **merely to modify** the system of Iwamoto et al. or Lu et al., as does the Examiner, is insufficient to

procedurally establish a *prima facie* case of obviousness under 35 U.S.C. §103. In particular, the Examiner fails to identify exactly which features/elements of the systems of Iwamoto et al. or Lu et al. would be modified and how in view of the SU '768 reference.

The rejection thus lacks the specificity necessary to articulate a rational underpinning behind the rejection. For this reason as well, the rejection based on the reference to SU '768 reference is deficient on its face, with respect to establishing a *prima facie* case of obviousness, and should be withdrawn.

D. Additional arguments against the rejection based on modifying the systems of Iwamoto et al. or Lu et al. in view of the secondary references.

The invention disclosed by Iwamoto et al. resides in the provision of nozzle openings B, C, D spread out as illustrated in FIG. 3 to prevent stagnation of the cleaning solution at the bottom of the cleaning chamber (col. 1, line 61 to col. 2, line 67, for example).

Modifying this arrangement in a manner resulting in Applicants' claimed invention would destroy this operation/gist of the invention of Iwamoto et al. Thus, the references do not establish a *prima facie* case of obviousness when viewed collectively even with the other art of record. See MPEP 2143.01 section V.

Lu et al. specifically reject supply nozzles in which sets of nozzle openings (prior art of FIGS. 3A, 3B of the reference) are provided in favor of first through fourth nozzles 8 in which single nozzle openings 63, 64 are provided. Modifying this arrangement in a manner resulting in Applicants' claimed invention would conflict with the teachings of Lu et al. Thus, the references do not establish a *prima facie* case of obviousness when viewed collectively even with the other art of record. See MPEP 2143.01 section II.

E. The Cheng reference

The Cheng reference was relied on by the Examiner for the teachings therein associated with discharge section including pipe 87. However, such teachings do not overcome the deficiencies in the references and rejections discussed above. Therefore, even assuming, arguendo, that one of ordinary skill in the art would have been prompted to have modified the systems of the Iwamoto et al. or Lu et al. references in view the teachings of Chen, the resulting combinations would still not meet Applicants' claims.

**II. AMENDMENTS TO CLAIM 1**

Claim 1 has also been amended so as to more clearly patentably distinguish the present invention over the body of references to Iwamoto et al. (USP 6,156,153), Lu et al. (USP 6,416,587), Lee (USP 6,001,216), SU 1063768 and Cheng (USP 5,885,403).

Specifically, claim 1 now specifies that each set of nozzle openings consists of five nozzle openings as shown in FIG. 5. None of the references teach such an aspect of the present invention. Hence, the references can not render amended claim 1 obvious even when considered in combination.

**III. NEW CLAIMS 11 – 17**

New independent claim 11 and dependent claims 12 and 13 set forth the configuration of the controller (FIG. 4) described in Applicants' specification. Such a configured controller is not suggested by the systems of the references relied on by the Examiner. That is, the controller of new dependent claims 12 and 13 is physically different, by means of its configuration, than controllers that facilitate the automation of the references.

For at least this reason, these claims clearly patentably distinguish the present invention over the body of references to Iwamoto et al. (USP 6,156,153), Lu et al. (USP 6,416,587), Lee (USP 6,001,216), SU 1063768 and Cheng (USP 5,885,403).

#### IV. SUMMARY

In summary, the Examiner has not procedurally established a *prima facie* case against Applicants' claims because the Examiner has not specified the elements/features in the primary references that are to be modified and the manner in which such elements/features would be modified based on the secondary references. The Examiner has also not established a *prima facie* case of obviousness based on the Lee reference because incorporating the teachings of Lee relied on by the Examiner into the systems of the primary references to Iwamoto et al. or Lu et al. would entail a change in function associated with the teachings. The Examiner has also not established a *prima facie* case of obviousness based on the SU '768 reference because the reference is not prior art. In addition, the modification of each primary reference proposed by the Examiner would render the primary reference unsatisfactory for its intended purpose and/or is inconsistent with the teachings of the primary reference. Furthermore, none of the references relied on by the Examiner teach a planar arrangement of nozzle openings subtending an angle of 80~100° about an inner nozzle passageway as recited in the claims and/or a controller configured to effect Applicants' specific interrelated supply and drain operations.

That is, for the reasons A1a –A1c, A2a –A2c, A3a –A3c, A4, B and C, it is seen that the references do not render the subject matter of Applicants' claims 1- 4 and 11 – 17 obvious under 35 U.S.C. §103. Accordingly, early reconsideration and allowance of the claims are respectfully requested.

Respectfully submitted,

VOLENTINE & WHITT, PLLC

/Adam C. Volentine/

Adam C. Volentine

Reg. No. 33289

**Customer No. 20987**

Volentine & Whitt, PLLC

Suite 1260

11951 Freedom Drive

Reston, VA 20190

Tel. (571) 283-0720

Date: November 29, 2010